

# Eco-Label Opportunities for Processing Vegetable Crops



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# Goals of Eco-Labeling Project

- **Increased adoption of advanced IPM technology**
  - ✓ pest tolerant cultivars
  - ✓ soil testing for pathogens
  - ✓ pest prediction
  - ✓ use of biologicals
- **Monitoring of pesticide toxicity for each spray**
- **Substitution with less hazardous pesticides**
- **Reductions in toxicity of season-long pest control**
- **Greater awareness of public policy issues**
- **Market-based incentives**

# Case Examples of Eco-Labeling Project

## ➤ Carrot Project

- ✓ Three growers
- ✓ Pest management consultant
- ✓ Processor staff
- ✓ UW team

## ➤ Snap Bean Project

- ✓ Two growers
- ✓ Processor staff
- ✓ UW team



# Carrot Production System Evaluation

## Three growers

- 2 sand
- 1 muck

## Cultivars

- Susceptible cultivars currently grown
- Several cultivars with improved disease or aster yellows resistance

## Scouting

- Use of scouting and infectivity information to calculate aster yellows index
- Use of scouting to initiate fungicide application, weather-based diseased forecasting model (TomCast) to schedule subsequent sprays

# Evaluation of IPM Practices on Carrots During 2003

IPM Category	WI "Next Step" Program	Current WI Program
Cultivar	<ul style="list-style-type: none"><li>• Bolero, Enterprise, Sirocco, Carson</li></ul>	<ul style="list-style-type: none"><li>• Heritage, Fontana or Danvers</li></ul>
Insecticide Program primarily for management of aster yellows	<ul style="list-style-type: none"><li>• Asana sprays at AYI of 75-100</li><li>• Scout weekly</li><li>• Infectivity assay every 2 weeks</li></ul>	<ul style="list-style-type: none"><li>• Asana sprays at AYI of 50</li><li>• Scout weekly</li><li>• Infectivity assay every 2 weeks</li></ul>

# Evaluation of IPM Practices on Carrots During 2003

IPM Category	WI "Next Step" Program	Current WI Program
<b>Cultivar</b>	<ul style="list-style-type: none"><li>• Bolero, Enterprise, Sirocco, Carson</li></ul>	<ul style="list-style-type: none"><li>• Heritage, Fontana or Danvers</li></ul>
<b>Fungicide Program</b> primarily for management of Alternaria leaf blight and Cercospora leaf blight	<ul style="list-style-type: none"><li>• Scout weekly from emergence</li><li>• Sprays begin at 1% disease</li><li>• Use TomCast Program – spray interval at 20 DSV, compare with 15 DSV for Heritage</li><li>• Alternate chlorothalonil and strobilurin chemistry beginning with chlorothalonil</li></ul>	<ul style="list-style-type: none"><li>• Scout weekly from emergence</li><li>• Sprays begin when plants reach about 6" in height – calendar approach</li><li>• Spray weekly with fungicide</li><li>• Spray program consists of chlorothalonil each spray</li></ul>

# Evaluation of IPM Practices on Carrots During 2003

IPM Category	WI "Next Step" Program	Current WI Program
Cultivar	<ul style="list-style-type: none"><li>• Bolero, Enterprise, Sirocco, Carson</li></ul>	<ul style="list-style-type: none"><li>• Heritage, Fontana or Danvers</li></ul>
Herbicide Program for management of broadleaf and grass weeds	<ul style="list-style-type: none"><li>• Scout weekly.</li><li>• Carefully timed sprays to coincide with crop growth and weed pressure</li></ul>	<ul style="list-style-type: none"><li>• Scout weekly</li><li>• Carefully timed sprays to coincide with crop growth and weed pressure</li></ul>

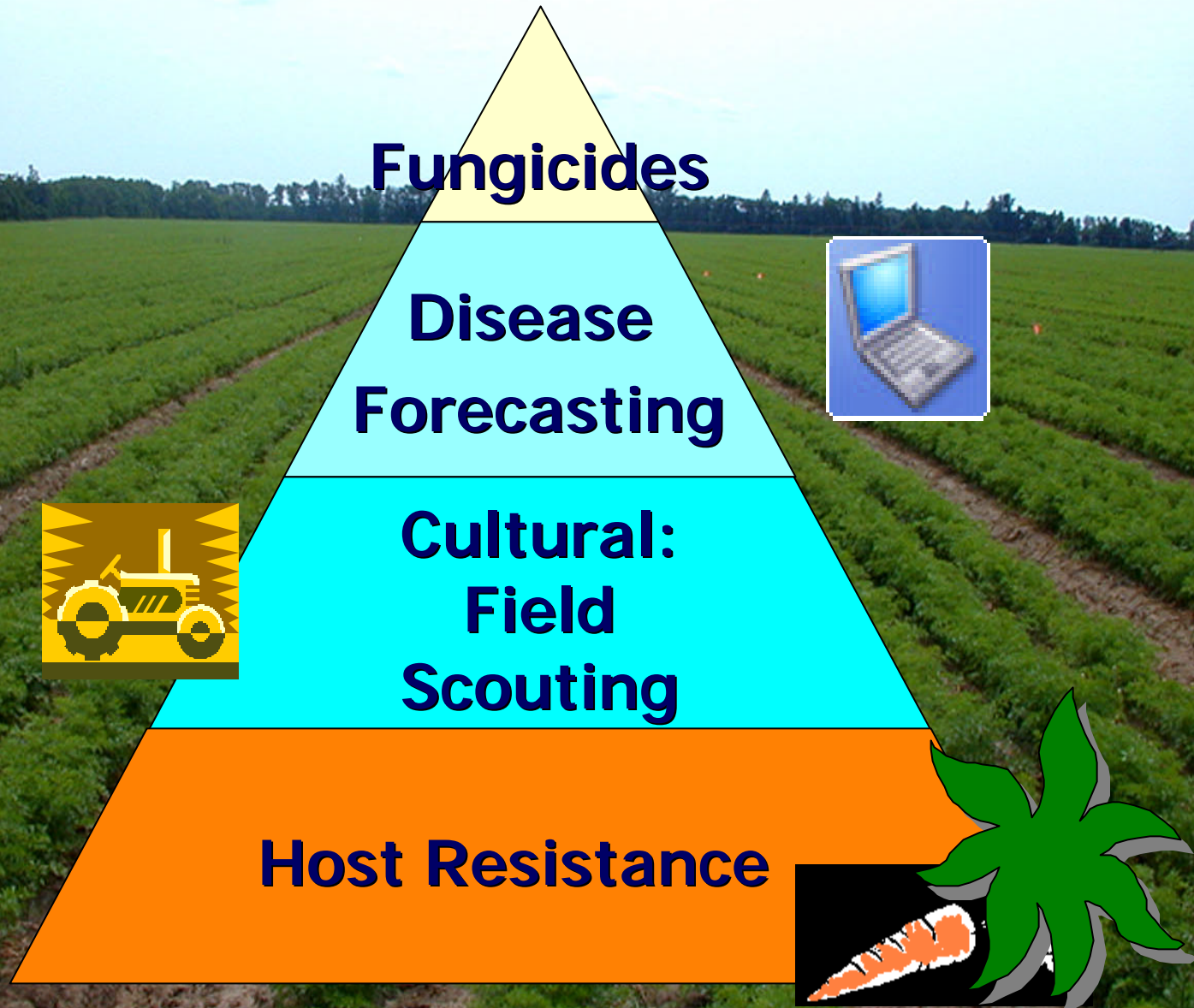


# Insect Control Spray Programs by Grower and Cultivar

	Cultivar	Program	# of sprays	Yield (t/A)	Aster Yellows (%)
<b>Grower #1</b>	Indiana	50 AYI	3	18.6	2.45
	Danvers 126	50 AYI	2	16.2	2.10
	Carson	50 AYI	2	19.1	4.16
		75 AYI	1	19.5	3.50
	Enterprise	50 AYI	2	20.3	1.96
		100 AYI	1	19.4	2.74
<b>Grower #2</b>	Heritage	50 AYI	3	30.5	2.50
	Bolero	50 AYI	1	22.9	3.70
		75 AYI	1	26.8	3.99
	Enterprise	50 AYI	2	21.8	2.86
		100 AYI	1	20.7	3.41
<b>Grower #3</b>	Heritage	50 AYI	4	18.4	2.16
		75 AYI	2	17.7	1.73
	Enterprise	50 AYI	3	16.4	2.11
		100 AYI	1	17.6	2.33



# Layering the Disease Management Pyramid





# Combining Disease Management Tactics

Evaluations with 3 large commercial growers at 3 locations

Weather-based programs vs. traditional calendar app. schedules

6 Commercial cultivars varying in susceptibility

Typical commercial fields

Field scouting    1 % Severity trigger    Reduced-risk fungicides

**\*\* Goal:** Reduce chemical inputs, # of fungicide applications, program toxicity and grower costs, while providing adequate disease control and yields

# Grower IPM 2003

## Grower 1 - Sand

Cultivar	Program	# of sprays	% Severity 9/19	AUDPC	Yield T/A
Danvers	Standard	7	11.1	0.067	21.0
	15 DSV	5	9.5	0.054	27.9
Indiana	Standard	7	13.4	0.076	28.6
	15 DSV	4	12.6	0.061	27.5
Enterprise	Standard	6	10.0	0.043	35.1
	15 DSV	5	7.7	0.040	32.8
	20 DSV	4	8.5	0.048	33.7
Carson	Standard	4	6.8	0.026	31.8
	15 DSV	2	9.7	0.032	31.3
	20 DSV	2	11.7	0.038	31.6
Pr>F	--	--	<0.01	<0.01	<0.01
LSD	--	--	2.3	0.011	3.4



# Chemical Application Summary- Indiana or Heritage (suscept.)

Utilizing reduced risk fungicides with weather based application schedules:

Treatment	Rate/Acre	ai/A (lb)	# of Sprays	Est. Chem. Cost (\$)	Toxicity Units
Bravo Standard	1.4 lb	8.0	7	68.60	661.08
Bravo /Quadris 15 DSV	1.4lb/ 9.2 fl oz	2.6	4	53.80	202.64

✓ Fungicide inputs limited

✓ Fewer applications

✓ Program cost is reduced

✓ Program toxicity decreased

# Chemical Application Summary- Bolero or Carson (resistant)

Utilizing reduced risk fungicides with weather based application schedules:

Treatment	Rate/Acre	ai/A (lb)	# of Sprays	Est. Chem. Cost (\$)	Toxicity Units
Bravo Standard	1.4 lb	4.6	4	39.20	377.76
Bravo/Quadris 20 DSV	1.4lb/ 9.2oz	1.3	2	28.50	101.32

- ✓ Fungicide inputs limited
- ✓ Program cost is reduced
- ✓ Fewer applications
- ✓ Program toxicity decreased



# Succulent Bean Production System Evaluation

## Two growers

- Central WI, sand

Factors compared alone and in combination to determine their contribution:

## Cultivars

- Standard cultivar currently grown, selected by processor
- Pest tolerant cultivar (white mold, root rot, bacterial leaf blight) selected by processor

## Fungicide

## Biological control

## Scouting

- To determine need/timing of insecticide, fungicide, herbicide application



# Evaluation of IPM Practices on Snap Beans During 2003

IPM Category	WI "Next Step" Program	Current WI Program
Cultivar	<ul style="list-style-type: none"><li>• Pest tolerant (white mold, root rot, bacterial leaf blight) cultivar selected by processor</li></ul>	<ul style="list-style-type: none"><li>• Standard cultivar selected by processor susceptible to white mold.</li></ul>
Biocontrol Program	<ul style="list-style-type: none"><li>• Treat field with Intercept biocontrol at 2 lb per acre preplant and incorporate</li></ul>	<ul style="list-style-type: none"><li>• No biocontrol applied</li></ul>
Fungicide Program	<ul style="list-style-type: none"><li>• Scout weekly from emergence</li><li>• Treat only if widespread white mold incidence in area (thiophanate methyl), but only as last resort</li></ul>	<ul style="list-style-type: none"><li>• Scout weekly from emergence</li><li>• Treat with with thiophanate methyl at 4-5 days after 10% bloom as precaution</li></ul>



# Evaluation of IPM Practices on Snap Beans During 2003

IPM Category	WI "Next Step" Program	Current WI Program
<b>Insecticide Seed – SCM</b>	<ul style="list-style-type: none"><li>• Treat seed - Gaucho (Cruiser pending label approval – will also control PLH, BLB, aphids)</li></ul>	<ul style="list-style-type: none"><li>• Treat seed with Lorsban</li></ul>
<b>Insecticide Plants</b> PLH, BLB Aphids	<ul style="list-style-type: none"><li>• Foliar to supplement seed trt <b>ONLY</b> if needed</li><li>• Capture – low rate – 1/sweep</li><li>• Capture – at winged aphid flight based on trap catch and monitoring of soybeans at flowering for aphid alates, use of weather models to predict aphid flights</li></ul>	<ul style="list-style-type: none"><li>• Foliar treatment is primary control</li><li>• Dimethoate, Asana – 1/sweep</li><li>• Dimethoate - at winged aphid flight based on trap catch</li></ul>
SCM = seedcorn maggot; BLB = bean leaf beetle; PLH = potato leafhopper; ECB = European corn borer		

# Evaluation of IPM Practices on Snap Beans During 2003

IPM Category	WI "Next Step" Program	Current WI Program
Insecticide Pod Stage ECB	<ul style="list-style-type: none"><li>• Capture – 30 to 7 dbh (days before harvest) (2 applications)</li></ul>	<ul style="list-style-type: none"><li>• Capture, Orthene - 30 to 7 dbh (days before harvest) (2 - 3 applications)</li></ul>

SCM = seedcorn maggot; BLB = bean leaf beetle; PLH = potato leafhopper;  
ECB = European corn borer

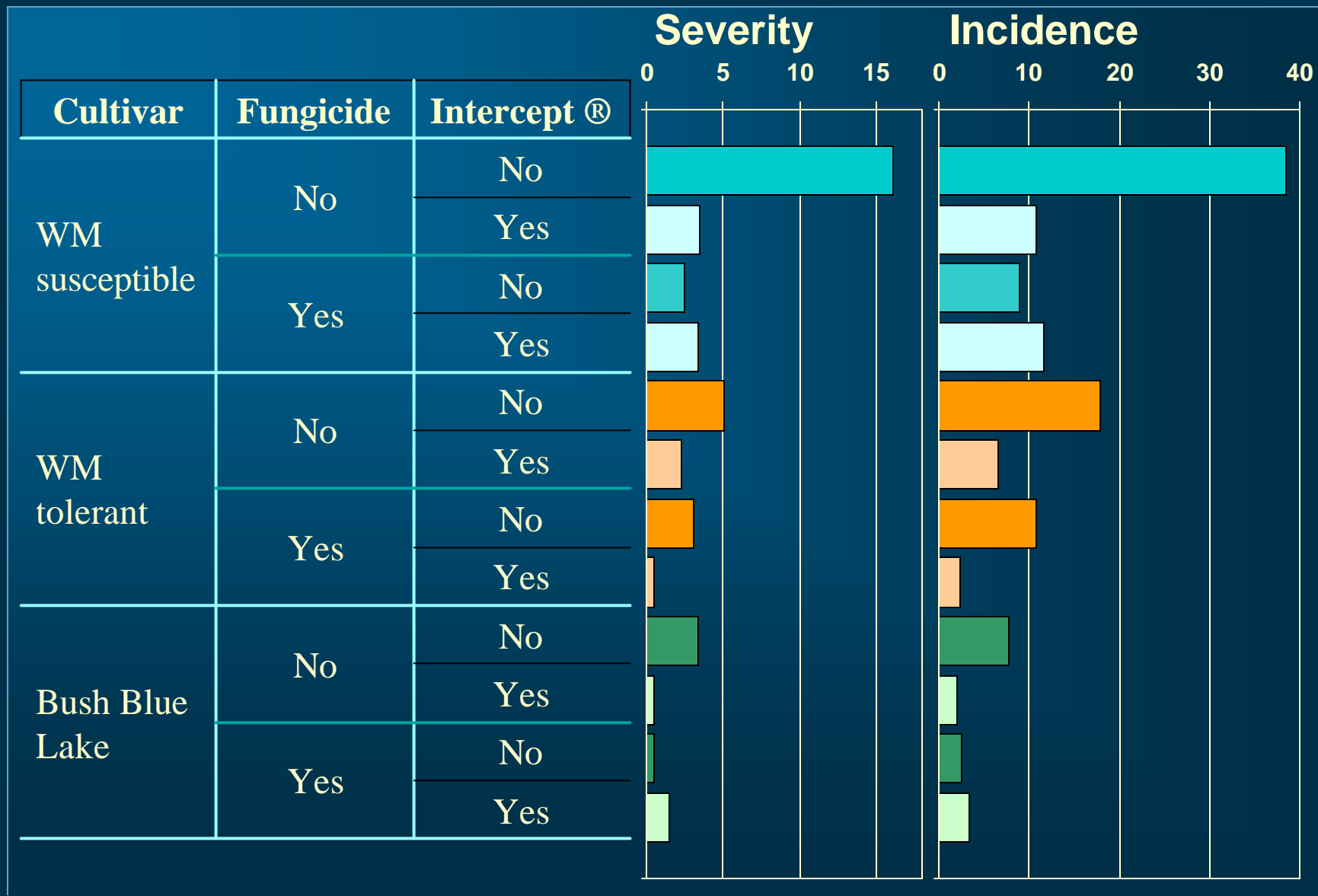
# Evaluation of IPM Practices on Snap Beans During 2003

IPM Category	WI "Next Step" Program	Current WI Program
Monitoring	• Aphids - Plant counts weekly – alates	
	• SCM - % stand / injury – early season	
	• BLB/PLH – weekly sweeps; PLH thresholds = 1/2 insect/ sweep up to 1st trifoliolate and 1/sweep after 1st trifoliolate; BLB thresholds to be determined	
	• ECB – black light trap (BLT) catches; scout field edge areas, several BLT's in area	• ECB – black light trap catches; scout field edge areas
SCM = seedcorn maggot; BLB = bean leaf beetle; PLH = potato leafhopper; ECB = European corn borer		

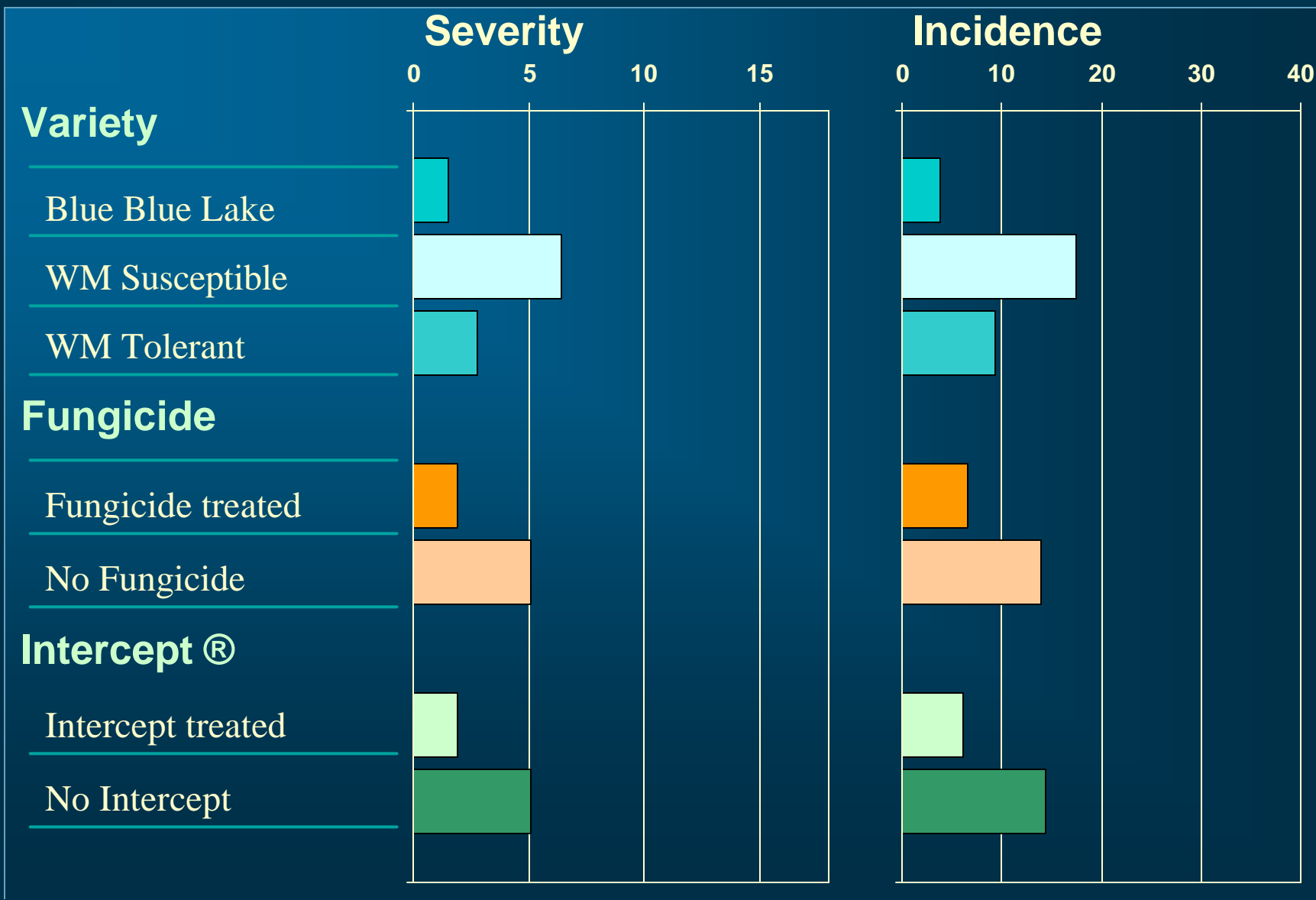
# Evaluation of IPM Practices on Snap Beans During 2003

IPM Category	WI "Next Step" Program	Current WI Program
Herbicide Program	<ul style="list-style-type: none"><li>• Scout weekly</li><li>• Carefully timed sprays of Dual, Treflan, Eptam and/or Sandia to coincide with crop growth and weed pressure (Sandia application based on field history of pigweed and waterhemp)</li></ul>	<ul style="list-style-type: none"><li>• Scout weekly</li><li>• Carefully timed sprays with options of Dual, Treflan or Eptam to coincide with crop growth and weed pressure</li></ul>

# Effect of treatment on incidence and severity of white mold on snap beans (Grower 1)



# Effect of factors on incidence and severity of white mold on snap beans (Grower 1)



# Overall Conclusions

## Techniques explored:

- Crop rotation
- Frequent field scouting
- Cultivar tolerance to key pests
- Use of treatment thresholds for insect management
- Use of weather-based thresholds for disease management
- Integration of reduced-risk pesticides for treatment



# Overall Conclusions

## Benefits:

- **Reduced:**
  - **Input costs**
  - **Amount of pesticide applied**
  - **Toxicity of season-long pest management programs**
- **While maintaining:**
  - **Crop health**
  - **Product quality**
  - **Yield**

## Overall Conclusions

Data collected in these field trials provide evidence that the eco-production of processing vegetables in central Wisconsin can move forward and set the stage for potential eco-labeling of processed products in the near future.